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09/855,132	05/14/2001	Eric A. Jacobsen	INTL-0548-US (P11107)	9082

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EXAMINER
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LEVITAN, DMITRY

ART UNIT	PAPER NUMBER
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2662

DATE MAILED: 03/03/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

09/855,132

Applicant(s)

JACOBSEN, ERIC A.

Examiner

Dmitry Levitan

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-30 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-30 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 12 February 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |   |  |
|---|--|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. ____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                  | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)            |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date ____ | 6) <input type="checkbox"/> Other: ____  |

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The amendment, filed on 02/12/04, has been entered. Claims 1-30 remain pending.

***Drawings***

1. The drawings were received on 02/12/04. These drawings are approved.
2. In light of the drawings corrections the objections to the drawings are withdrawn.

***Claim Rejections - 35 USC § 112***

3. In light of Applicant's remarks, the rejection of claims 4, 8, 9, 18, 19, 28 and 29 under 35 U.S.C. 112, first paragraph is withdrawn.
4. Claims 1-30 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 1, 11 and 21 limitation "discrete frequency transformation" is unclear, because it is not described in the specification or well known in the art. Compare with discrete Fourier transformation, well known in the art.

Claims 14 and 24 limitation "components of DFT" is unclear, because DFT (discrete frequency transformation) it is not described in the specification or well known in the art.

***Claim Rejections - 35 USC § 102***

5. Regarding claims 10, 20 and 30, van Nee teaches the mathematical operations Claims 1-7, 9-17, 19-27, 29 and 30 are rejected under 35 U.S.C. 102(e) as being anticipated by van Nee (US 6,175,550).

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Regarding claims 1-3, 11-13 and 21-23, van Nee teaches a method, a system and storage medium instructions (Fig. 1 and 3:66-67, 4:1-17,10:34-48), comprising:

Basing a DFT (IDFT 16 on Fig. 1 and 4:44-48, 3:53-58) on the number of sub-carriers (N carriers 6:10-14) in a predetermined set of sub-carriers (X carriers 6:10-14), one or more sub-carriers of the set assigned to modulate data (5:58-67 and 6:1-9) and the remaining sub-carriers of the set not assigned to modulate the data (5:58-67 and 6:1-9);

Performing DFT on the data to modulate the data (IDFT 16 on Fig. 1) and

Excluding from the transformation mathematical operations associated with the sub-carriers not assigned to modulate the data (X-point IFFT 6:10-14).

Regarding claim 4, van Nee teaches applying a weighting function (windowing 6:23-35) during DFT to perform symbol shaping (6:32-35).

Regarding claims 5, 15 and 25, van Nee teaches sub-carriers assigned to users (remote stations 74 on Fig. 5 and 7:40-61).

Regarding claims 6, 16 and 26, van Nee teaches forming an OFDM symbol (4:57-60).

Regarding claims 7, 17 and 27, van Nee teaches using the transformation to generate symbols at a rate defined by symbol generation interval (Symbol duration  $T_s$  5:6-23); basing the DFT on the symbol generation interval (4:58-67); and

Using DFT to generate discrete modulated values for an interval that exceeds the symbol generation interval (5:6-22) to generate a cyclic extension (guard time 6:24-31).

of accumulation and multiplication (inherently part of IFFT technique, admitted as conventional IFFT technique in current application Fig. 2 and 5:3-8).

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Regarding claims 14 and 24, van Nee teaches determining components of DFT independently from each other (orthogonal carriers 6:10-23).

Regarding claims 9, 19 and 29, van Nee teaches selectively pre-rotating phases of sub-carriers (phase shift keying 4:31-43) to generate a cyclic prefix (Cyclic prefix 18 on Fig. 1).

### ***Claim Rejections - 35 USC § 103***

6. Claims 8, 18 and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over van Nee in view of Bohnke (US 6,535,501).

Van Nee substantially teaches all the limitations of claims 1, 7 and 8.

van Nee does not teach transmitting symbols during the intervals that exceeds the symbol generation interval.

Bohnke teaches transmitting symbols during the intervals that exceeds the symbol generation interval (transmitting symbols during the guard band intervals 1:38-56). It would have been obvious to one of ordinary skill in the art at the time the invention was made to add transmitting symbols during the intervals that exceeds the symbol generation interval of Bohnke to the system of van Nee to improve the system spectral efficiency.

### ***Response to Arguments***

7. Applicant's arguments filed 02/12/04 have been fully considered but they are not persuasive.

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On pages 8 and 9 of the Response, Applicant argues that the specification describes numerous discrete frequency transformations (DFTs) and inverse discrete frequency transformations (IDFTs).

Examiner respectfully disagrees.

On page 3, lines 21-22 of the disclosure, abbreviation IDFT is explained as Inverse Discrete **Fourier** Transform. This is well known and accepted term of the art.

However, Examiner believes that terms discrete **frequency** transformation (DFT) and inverse discrete **frequency** transformation (IDFT) are unclear, because they are not known in the art or described in the specification.

Claims 1, 11, 14, 21 and 24 were rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention, because the claims comprise unclear terms: discrete frequency transformation (DFT) and inverse discrete frequency transformation (IDFT).

On pages 10 and 11 of the Response, Applicant argues that van Nee does not describe that mathematical operations associated with dropped subcarriers are excluded from the IFFT.

Examiner respectfully disagrees.

Exclusion of mathematical operations associated with dropped carriers is inherent part of van Nee system, because one of the goals of dropping carriers is a reduction of implementation complexity (3:3-21) and performing mathematical operation with no input (dropped carriers) is not an acceptable practice.

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Examiner therefore believes that the cited references meet all the claims limitations and the rejection is proper.

***Conclusion***

8. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dmitry Levitan whose telephone number is 703-305-4384. The examiner can normally be reached on 8:30 to 4:30.


If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hassan Kizou can be reached on 703-305-4744. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Dmitry Levitan  
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02/27/04.



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